

## REMARKS

Claims 72-79 and 81-86 are pending in this application. Claims 81-86 have been amended. No new matter has been introduced. Applicant acknowledges with appreciation the allowance of claims 72-79.

Claims 81 and 85 stand rejected under 35 U.S.C. §102(b) as being anticipated by Fan et al. et al. (U.S. Patent No. 5,440,412) ("Fan"). This rejection is respectfully traversed.

The claimed invention relates to a solid material having spatial regions arranged in a periodic array. As such, amended independent claim 81 recites a "solid material having regions arranged within said solid material in a periodic array, said regions being completely surrounded by said solid material and having different particle diffraction patterns than said solid material without regions." Amended independent claim 81 also recites that the regions comprise "a material different from the material of said solid material." Amended independent claim 81 further recites that the solid material "includes silicon dioxide" and that the material of the regions "is selected from the group consisting of aluminum, silicon and germanium."

Fan relates to a "three-dimensional photonic bandgap" that "includes a plurality of layers, each layer having a stratum of a first material having a first dielectric constant and a plurality of parallel grooves along a first axis lying in the plane of the layer, the grooves including a second material having a second dielectric constant." (Abstract). Fan also teaches "a plurality of parallel channels formed through the plurality of layers in a second axis orthogonal to the plane of the layers, the channels being adapted to comprise a third material having a third dielectric constant, thereby resulting in the structure having three-dimensional periodicity." (Abstract).

Fan fails to anticipate the subject matter of claims 81 and 85. Fan does not disclose, teach or suggest a "solid material having regions arranged . . . in a periodic array" and "being completely surrounded by said solid material," so that "said solid material includes silicon dioxide and said material . . . is selected from the group consisting of aluminum, silicon and germanium, " as amended independent claim 81 recites. Fan teaches a plurality of grooves etched within layers of silicon semiconductor material and then filled with silicon oxide ( $\text{SiO}_2$ ) to form grooves 26 with  $\text{SiO}_2$ . Thus, Fan fails to disclose, teach or suggest that the solid material "includes silicon dioxide" and that the "material of said regions is selected from the group consisting of aluminum, silicon and germanium, "as in the claimed invention. For at least these reasons, the subject matter of claims 81 and 85 is not anticipated by Fan, and withdrawal of the rejection of these claims is respectfully requested.

Claims 82-84 and 86 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Fan in view of Zakhidov et al. (U.S. Patent No. 6,261,469) ("Zakhidov"). This rejection is respectfully traversed.

Zakhidov relates to a "self assembly of three-dimensionally periodic arrays of spherical particles" and to "the processing of these arrays so that both infiltration and extraction processes can occur, one or more infiltration steps for these periodic arrays, and, in some instances, extraction steps." (Abstract). For this, Zakhidov teaches "(a) crystallizing spheres of material A into a first structure having three-dimensional periodicity, and voids between spheres, wherein the material A is mechanically and thermally stable to at least about 300° C., (b) treating this first structure so that necks are formed between the spheres of material A, (c) infiltrating said first structure with material B to form a A-B composite structure, and (d) removing material A from said A-

B composite structure to form a second structure comprising material B.” (Col. 3, lines 30-40).

The subject matter of claims 82-84 and 86 would not have been obvious over Fan in view of Zakhidov. Specifically, the Office Action fails to establish a *prima facie* case of obviousness. Courts have generally recognized that a showing of a *prima facie* case of obviousness necessitates three requirements: (i) some suggestion or motivation, either in the references themselves or in the knowledge of a person of ordinary skill in the art, to modify the reference or combine the reference teachings; (ii) a reasonable expectation of success; and (iii) the prior art references must teach or suggest all claim limitations. See e.g., In re Dembiczak, 175 F.3d 994 (Fed. Cir. 1999); In re Rouffet, 149 F.3d 1350, 1355 (Fed. Cir. 1998); Pro-Mold & Tool Co. v. Great Lakes Plastics, Inc., 75 F.3d 1568, 1573 (Fed. Cir. 1996).

In the present case, Fan and Zakhidov, whether considered alone or in combination, fail to disclose, teach or suggest all limitations of amended independent claim 81. As noted above, Fan does not teach or suggest a “solid material having regions arranged . . . in a periodic array” “being completely surrounded by said solid material,” wherein “said solid material includes silicon dioxide and said material of said regions is selected from the group consisting of aluminum, silicon and germanium, “as in the claimed invention.

Similarly, Zakhidov fails to disclose, teach or suggest all limitations of amended independent claim 81. Zakhidov teaches “assembling . . . monodispersed spheres of material A (such as 250 nm SiO<sub>2</sub> spheres) into an ‘opal-like’ lattice . . . having a packing or spheres that is similar to the well-known packing of SiO<sub>2</sub> spheres in natural gem opal.” (Col. 6, lines 35-40). Thus, Zakhidov specifically teaches the formation of SiO<sub>2</sub> spheres within a carbon opal. Accordingly, Zakhidov is silent about a

solid material that includes silicon dioxide or about a material that "is selected from the group consisting of aluminum, silicon and germanium," as in the claimed invention. For at least these reasons, the Office Action fails to establish a *prima facie* case of obviousness, and withdrawal of the rejection of claims 82-84 and 86 is also respectfully requested.

Allowance of the application is solicited.

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